



American  
Bankers  
Association

## ABAToolbox on Liquidity

ABA Members Only

# Tool 4: Measuring Asset-Based Liquidity with the Liquidity Coverage Ratio



## Dear Reader,

Welcome to Tool 4 of the ABA Liquidity Toolbox. The Interagency Guidance on Liquidity and Funds Management (Guidance) emphasizes the role of asset-based liquidity as an important component of a community bank's liquidity buffer. However, the Guidance provides little insight into how to determine the minimum size of that buffer. We reached into the Basel III International Framework for Liquidity Risk Standards and Monitoring for its liquidity coverage ratio (LCR), designed to evaluate the adequacy of asset-based liquidity buffers.

We are providing a spreadsheet that runs the LCR calculation and screen shots of the LCR calculation for XYZ Bank. This is available at [www.aba.com/LiquidityToolbox](http://www.aba.com/LiquidityToolbox). Tool 4 also contains a discussion of the various securities typically found in a community bank's security portfolio and how they fit into a liquidity strategy.

Many thanks to Jeff Goebel of UMB Bank for his contributions to the securities resource in Tool 4.



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Mr. Farin is the author of three separate books on financial institution asset-liability management, as well as a popular asset-liability newsletter. FARIN & Associates is best known for using technology and education to help community banks develop and implement retail strategies.



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# Measuring Asset-Based Liquidity with the Liquidity Coverage Ratio

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## Glossary

**Breadth and Depth of Market** – A term used to describe the size of a security market, diversity of participants and other factors that partially determine how readily a security can be converted into cash

**Expected Cash Inflows** – Inflows of cash from investments, loans, deposits and borrowings over a time horizon; projections generally consider an institution's current balance sheet and its business plan

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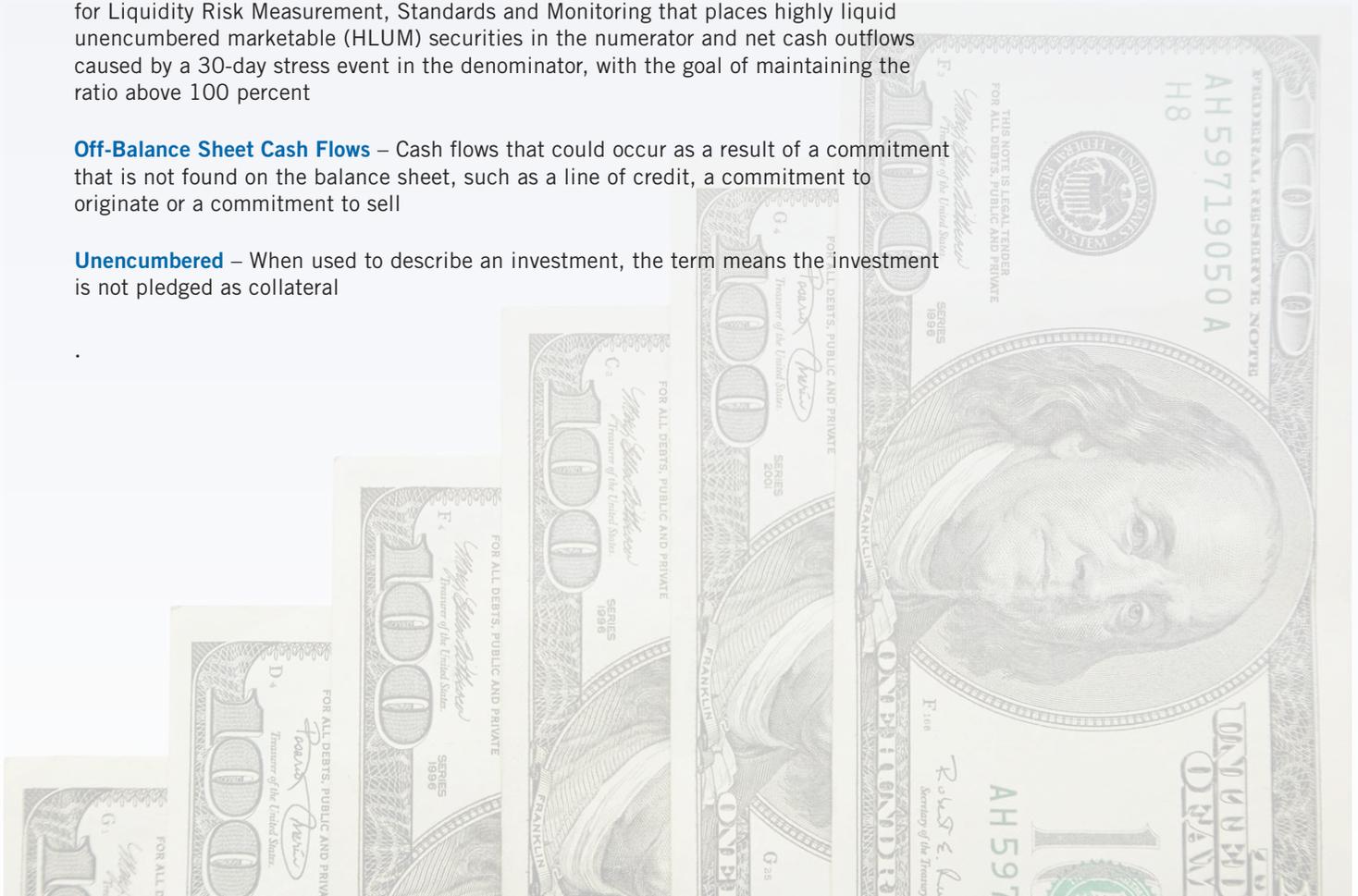
**Level 1 Security** – Under the Basel III Liquidity Standards, securities that are most readily convertible into cash; a risk weight of 0% under the Basel II Capital Standards is an important qualifying criteria, although there are a number of other factors

**Level 2 Security** – Under the Basel III Liquidity Standards, securities that are fairly readily convertible into cash; a risk weight of 20% under the Basel II Capital Standards is an important qualifying criteria, although there are a number of other factors

**Liquidity Coverage Ratio (LCR)** - A ratio created in the Basel III International Framework for Liquidity Risk Measurement, Standards and Monitoring that places highly liquid unencumbered marketable (HLUM) securities in the numerator and net cash outflows caused by a 30-day stress event in the denominator, with the goal of maintaining the ratio above 100 percent

**Off-Balance Sheet Cash Flows** – Cash flows that could occur as a result of a commitment that is not found on the balance sheet, such as a line of credit, a commitment to originate or a commitment to sell

**Unencumbered** – When used to describe an investment, the term means the investment is not pledged as collateral



# Assets Produce Income and Meet Liquidity Needs

The concept of asset-based liquidity has been around ever since institutions have been asked to measure liquidity. There are a number of ways assets provide cash to meet liquidity needs.

- Investments carried on the books with values near to or above par can be sold to raise cash.
- Many of the investments on the books generate cash through repurchase agreement transactions.
- Many loans and investments can be pledged as collateral for borrowings or to provide protection to those supplying uninsured deposits.
- Investments and loans maturing in the short-term can be used to raise cash.
- Even long-term loans and investments can generate substantial short-term cash flows due to amortization, prepayments, and calls.

Regulators rank asset-based liquidity as the most desirable source of liquidity.

Asset-based liquidity sources also carry yields and produce income for an institution at the same time they serve as a source of liquidity. It should come as no surprise that regulators rank asset-based liquidity as the most desirable source of liquidity, especially when a stress event creates significant short-term cash flow needs.

Tool 4 is organized to review both regulatory and practical aspects of asset-based liquidity. It covers the following topics:

- **Liquidity Coverage Ratio** explores the regulatory thought process on the liquidity coverage ratio (LCR), drawing on a combination of the “Joint Interagency Guidance on Liquidity and Funds Management” (Guidance Document) released in April 2010 and the Basel III liquidity standards released in December 2010. It also provides a practical guide to using the LCR.
- **Investment Portfolio Analysis** outlines the features of investments that affect return and their potential use as a liquidity source.
- **Major Security Types** covers the most typical classes of securities found in a community bank portfolio, evaluating strengths and weaknesses of each. A worksheet is provided for use in reviewing other investment alternatives.
- **Case Studies** uses the LCR to evaluate whether XYZ Bank’s level of asset-based liquidity is adequate to meet regulatory guidelines.

# Liquidity Coverage Ratio

In the past, regulatory agencies used Call Report data to track static measures of liquidity. Recently, the industry has moved toward a more dynamic evaluation of liquidity that considers cash flows as they relate to the balance sheet. The movement to cash flow based liquidity measurement systems reduces the reliance on historical liquidity ratios as the primary measure of an institution's liquidity while taking into consideration the role of an institution's business plan or strategy. However, while the recent guidance document from the Federal Financial Institutions Examination Council (FFIEC) calls for a movement toward cash flow based measurement systems, it fails to define the framework for performing cash flow based liquidity analysis.

In a search for a more tightly defined framework, we turned to the December 2010 Basel III liquidity standards. The Basel III standards propose new approaches to the measurement systems used in looking at liquidity risk. Full phase-in by Basel will not begin until January of 2015, and the U.S. banking agencies have not yet incorporated the Basel III liquidity standards into a rulemaking. However, we believe the Basel standards will evolve into a consistent set of measurement tools that can be used to gauge the performance of each institution's current balance sheet and business strategies, requiring that some institutions take management actions to mitigate their level of liquidity risk.

The Basel III standards define two new regulatory stress test ratios – the LCR and the net stable funding ratio (NSFR), which will be introduced in Tool 5. Although not specifically adopted by U.S. regulators yet, the LCR is a useful tool in assessing whether the institution has adequate levels of highly liquid unencumbered marketable (HLUM) securities at any given point in time under a liquidity stress scenario. The LCR measures whether the institution has sufficient levels of HLUM securities and expected cash flow to cover a short-term liquidity crisis event covering 30 days.

A high-level overview of the LCR follows, with a resource section that contains a more detailed outline of the Basel III liquidity standards.

The industry has moved to a dynamic evaluation of liquidity that considers cash flows as they relate to the balance sheet.

As designed by Basel, the LCR is a generic stress test that anticipates a market-wide shock similar to the financial crisis that began in 2008, and integrates a number of scenarios that played out during the recent financial crisis, including the following:

- Removes access to new Non-Core Funding
- Assumes significant outflows of Core and Near-Core Funding
- Assumes that incoming cash flows from non-performing loans will be reduced
- Assumes a portion of incoming cash flows from performing loans will be replaced with new originations
- Assumes securities will be subject to haircuts when the institution converts them to cash
- Assumes that some of the institution's credit commitments will be drawn down by customers

The LCR takes into consideration not just the securities and cash position we will discuss in detail later in Tool 4, but also expected cash inflows from a liquid asset buffer, and expected cash outflows.

## Liquid Asset Buffer

The liquid asset buffer is made up of liquid assets held in reserve for conversion into cash during a liquidity stress event. The liquid asset buffer is the numerator of the LCR calculation. The buffer is made up of the following:

- Cash and cash equivalents not required for daily operations (Fed Funds Sold, overnight deposits, money market funds, etc.)
- Assets that are considered high-quality HLUM securities
- Assets that can be converted into cash with little loss of principal
- Assets that can be pledged as collateral for borrowing (primarily agency and government-backed securities)

We will review liquid assets in more detail starting on page 10.

...the Basel III capital and liquidity standards will gradually raise the level of high-quality capital in the banking system, increase liquidity buffers and reduce unstable funding structures.

Mr Nout Wellink, Chairman of the Basel Committee on Banking Supervision and President of the Netherlands Bank, at the release of the Basel III Capital Framework

The LCR allows institutions to also consider the inflows associated with loans and investments. All contractual amounts from retail and wholesale contracts that are performing should be counted. However, it excludes items with both asset and liability flows – such as repos and secured lending. In addition, no non-financial revenue flows are allowed, including access to credit lines. Finally cash flows from securities counted as HLUM securities need to be excluded from inflows to avoid double counting of those balances.

A contentious point is the expected non-contractual level of repayment on loans. Under normal business conditions, a great amount of non-contractual payments are made in the form of extra payments, rounded payments, or prepayments that accelerate the repayment of principal. For the bank, the extra payments and prepayments represent cash flows that could be used to meet liquidity needs. Therefore, we have made provisions in our calculation of the LCR to allow entry of both contractual flows and expected prepayments and to show the impact on liquidity sources. We provide a mechanism for both the contractual cash flows and the prepayments to be discounted. Contractual cash flows from performing loans can be discounted to reflect the fact the institution is likely to originate loans to replace a portion of these cash flows. Prepayment cash flows can be discounted to reflect prepayment slowdowns in times of stress as well as the fact that final U.S. banking regulations may not allow consideration of prepayment cash flows. Discounts should be modified under various stress conditions to monitor the impact of deteriorating credit conditions on both scheduled payments and prepayments.

## Net Cash Outflows

Net cash outflows are the cash outflows less the inflows discussed in the previous sections. However, inflows are limited in the Basel III LCR to no more than 75% of outflows. Net cash outflows are the denominator of the Basel III LCR calculation.

## Expected Cash Outflows

The LCR also considers the potential *outflows of funds* caused by stress events. The potential outflows come from deposits, borrowing, and commitments to lend.

### Retail and Small Business Deposit Outflows

To assess the risk of deposit outflows, deposits are separated into two different classifications, Stable and Less Stable.

[New] standards have been developed to achieve two separate but complementary objectives. The first objective is to promote short-term resilience of a bank's liquidity risk profile by ensuring that it has sufficient high-quality liquid assets to survive a significant stress scenario lasting for one month. The Committee developed the Liquidity Coverage Ratio (LCR) to achieve this objective.

**Stable:** For deposits, Basel defines “stable” deposits as those where there are transactional or other small business relationships in existence and the funds are covered by effective deposit insurance.

**Less Stable:** Bank-to-bank relationships, or deposits where there are no other significant relationships, are considered less stable.

We assume for the purpose of the Toolbox that deposits covered by FDIC insurance are stable and deposits in excess of the FDIC insurance cap are less stable.

Once the accounts are classified, coverage ratios (expected runoff rates) are assigned to the differing balance types. For stable non-maturity deposits, a run-off factor of 5 percent is the minimum standard under the Basel guidance, while less stable non-maturity deposits assume a minimum 10 percent runoff.

Runoff rates are an indicator of the level of potential flight risk for funds in a short term (30-day) window. Runoff standards apply to both natural person depositors and small business depositors.

#### **NOTE: The Special Case of CDs**

In the case of CDs the calculation approach and the interpretation by U.S. regulators are less clear. Basel takes the position that if early withdrawal penalties are equal to or less than the loss of interest, the entire CD balance is subject to flight risk. However, deposit insurance is so well-established in the U.S. that it is much less likely the customer will break the contract, pay the penalty and withdraw all the funds. For that reason the stable funds runoff rate (5 percent) is applied to just those stable funds maturing in the next 30 days. For less stable CD deposits, the 10 percent runoff rate is applied to deposits maturing in the next 30 days. In situations where the early withdrawal penalty is deemed to be inadequate, the 5 percent and 10 percent minimum runoff assumption is applied to the entire CD portfolio, not just the portion maturing in the next 30 days. Although it is unclear how U.S. regulators will respond to the Basel interpretation, all banks should review their early withdrawal penalties on CDs to ensure the penalties are sufficient to deter customers from breaking the contract.

## **Wholesale Funding Outflows**

Generally, the Basel III LCR calculation assumes no new wholesale funding can be taken down in the 30-day period covered by the stress. It also assumes that any wholesale funding maturing in the 30-day period covered by the test must be paid off. However, an exception is made in two cases:

- **When wholesale funding is provided by non-financial corporations** (generally large business deposits), runoff will be reduced in the 30-day period to either 25 percent or 75 percent of balances depending on whether the funding is part of an operating relationship..
- **When secured wholesale funding is backed by collateral** that would otherwise count as a HLUM security under the LCR, the runoff rate may be reduced to between 0 percent and 25 percent depending on the quality of the asset pledged as collateral. That is because the pledged asset, which is not considered to be part of the institution’s HLUM securities, could be converted into cash to pay off the wholesale funding.

## Off-Balance Sheet Outflows

The final item that is considered in the LCR is outflows from off-balance sheet items – credit commitments to customers that are not currently drawn and consequently do not appear in the loan portfolio. During periods of financial stress, customers are more likely to tap into unused lines because of personal or business financial stress or the fear that the bank may experience stress and withdraw or lower the line.

The off-balance sheet items to consider are:

- Unused existing lines of credit
- Letters of credit
- Firm commitments to originate
- Other unused commitments

### Firm Commitments to Originate

While a firm commitment may not currently be in place to fund a particular loan maturing in the next 30 days, the institution may feel it has a moral obligation, a legal obligation, or a strong business reason to re-fund a customer’s maturing loan. For example a good business customer may have a line of credit coming due in the next 30 days. While the bank may have a legal right to call the line when due, customers may have come to expect that lines will roll over at maturity. To demand payment of the loan could lead to loss of a valuable customer relationship. In some states, the bank has a legal obligation to re-fund consumer balloon mortgages at maturity. While there may be no obligation to re-fund a balloon commercial real estate loan at maturity, there may be very good business reasons to do so. For that reason the Basel III LCR test assumes that 50 percent of incoming loan cash flows are reoriginated into new loans.

## The following are key elements of the LCR as outlined in Basel III

### High-Quality, Unencumbered Liquid Assets

- Sufficient to cover completely the total net cash outflows over the next 30 calendar days under a combined idiosyncratic and market-wide shock
- Cash inflows may only offset 75% of expected outflows; that is, a bank must maintain a minimum stock of liquid assets equal to 25% of outflows in order to prevent banks from relying solely on anticipated inflows to meet cash outflows
- Assets should be liquid in markets during a time of stress and ideally be Federal Reserve-eligible; however, Federal Reserve-eligibility does not by itself constitute the basis for categorization as a high-quality liquid asset
- High-quality liquid assets can be easily and immediately converted into cash at little or no loss of value
- In order to avoid “cliff effects,” assets that become ineligible due to downgrade or for other reasons can continue to be included in the stock for 30 days
- Unencumbered means not pledged (explicitly or implicitly) to secure, collateralize, or credit-enhance any transaction; however, in a change from the proposal –
  - Assets received in reverse repo and securities funding transactions (SFTs) that are held at the bank, have not been rehypothecated, and are legally and contractually available for the bank’s use may be included
  - Assets pledged to a public sector entity (PSE), as well as a central bank, but not used, also may be included
- Committee is reviewing the treatment of intraday liquidity risk
- Foreign exchange liquidity risk must be considered; banks are expected to be able to meet liquidity needs in each currency

### Level 1 Assets

- Cash
- Central bank reserves, to the extent that these reserves can be drawn down in times of stress

- Marketable securities representing claims on or claims guaranteed by sovereigns, central banks, non-central government PSEs, the Bank for International Settlements, the International Monetary Fund, the European Commission, or multilateral development banks and satisfying all of the following conditions:
  - Assigned a 0% risk-weight under the Basel II Standardised Approach
  - Traded in large, deep and active repo or cash markets characterized by a low level of concentration
  - Proven track record as a reliable source of liquidity in the markets (repo or sale) even during stressed market conditions
  - Not an obligation of a financial institution or any of its affiliated entities

**Level 2 Assets** can account for up to 40% of the total liquid assets stock, after haircuts. Level 2 liquid assets comprise:

- Level 1 assets generated by SFTs or collateral swaps maturing within 30 days
- Subject to a 15% haircut:
  - Marketable securities representing claims on or guaranteed by sovereigns, central banks, non-government PSEs or multilateral development banks that are assigned a 20% risk weight under the Basel standardized capital rules; traded in large, deep, and active markets; proven reliable under stressed conditions; and not an obligation of a financial institution or an affiliate of a financial institution
  - Corporate bonds and covered bonds that are not issued by a financial institution or, in the case of corporate bonds, an affiliate of a financial institution; have a credit rating of at least AA-; traded in large, deep, and active markets; and proven reliable under stressed conditions

### Total Net Cash Outflows

- Total net cash outflows are total expected cash outflows, multiplied by specified runoff rates, minus total expected cash inflows over the subsequent 30 calendar days

## Runoff Rates for Cash Outflows

- Stable retail deposit runoff rate is 5% and less stable retail runoff rate is 10%
  - Deposit insurance alone does not make a deposit stable; however, for the purpose of the Toolbox, we will assume that FDIC-insured deposits are stable. In the case of CDs, the bank should review its early withdrawal penalties to ensure that they are sufficient to deter customers from breaking the contract
  - Small business customers treated as retail customers
- Unsecured wholesale funding with operational relationships subject to 25% runoff factor
  - Includes clearing, custody, or cash management services, but not correspondent banking or prime brokerage
  - Unsecured wholesale funding provided by non-financial corporate customers, sovereigns, central banks, and PSEs with operational relationships fully covered by deposit insurance can be treated as stable retail deposits with a runoff rate of 5%
- Deposits in institutional networks of cooperative banks can qualify for a 25% runoff rate
- Unsecured wholesale funding from non-financial corporates, sovereigns, central banks, and PSEs are subject to a 75% runoff rate
- Unsecured wholesale funding by other institutions – including financial institutions – are subject to a 100% runoff rate
- Secured funding transactions are eligible for the 15% bucket backed by Level 2 assets and the 25% bucket for transactions with domestic sovereign, central banks, or PSE risk-weighted at 20% or lower that are not backed by Level 1 or Level 2 assets
- Derivatives payables subject to 100% runoff and amounts are taken into account on a net basis
- Other off-balance sheet items generally subject to assumption of 100%

- National discretion for runoff rates for contingent funding obligations, including unconditionally revocable credit and liquidity facilities, guarantees, letters of credit, and trade finance
- While a firm commitment may not currently be in place to fund a particular loan maturing in the next 30 days, the institution may feel it has a moral obligation, a legal obligation, or a strong business reason to re-fund a customer's maturing loan. For example, a good business customer may have a line of credit coming due in the next 30 days. While the bank may have a legal right to call the line when due, customers may have come to expect that lines will roll over at maturity. To demand payment of the loan could lead to loss of a valuable customer relationship. In some states, the bank has a legal obligation to re-fund consumer balloon mortgages at maturity. While there may be no obligation to re-fund a balloon commercial real estate loan at maturity, there may be very good business reasons to do so. Inflow rates are more detailed than in the proposal

## Inflow Rates

- Maturing reverse repo or securities borrowing transactions secured by Level 1 assets are subject to a 0% cash inflow rate; for Level 2 collateral, the rate is 15%; and for non-Level 1 or Level 2 collateral, the rate is 100%
  - If the collateral is rehypothecated to cover short positions, the inflow rate is 0%
- Operational and cooperative banking deposits receive a 0% inflow rate
- Lines of credit, liquidity facilities, and other contingent funding receive a 0% inflow rate
- Retail and small business inflows are 50% of the contractual amount, as are inflows from non-financial wholesale counterparties
- Financial wholesale counterparties are subject to a 100% inflow rate
- Derivatives receivables are subject to a 100% inflow rate on a net basis

## Investment Portfolio Analysis

The investment portfolio of an institution is an excellent source of liquidity in most circumstances; however, there are exceptions. Under some economic events, some securities may not have a market at all, or if sold will need to be sold at a significant discount. Some cash flows from both long-term loans and long-term investments may be affected by adverse economic environments. Certain investments might not be accepted for repo transactions. Certain loans and investments may not be accepted as collateral for collateralized borrowings.

For that reason, it is important to evaluate carefully the securities included in an investment portfolio. The following is a list of practical items that can be considered in evaluating securities:

- Liquidity/Yield Trade-off
- Breadth and Depth of Market
- Credit Risk
- Interest Rate Risk
- Option Risk
- Marketability at Minimum or No Loss
- Acceptance as Collateral
- Usability in Repo Transactions
- Treatment as a *Highly Liquid Marketable Security*?

More detail follows on each of these categories.

Beginning on page 13 is a resource section that reviews the major classes of securities in a community bank portfolio following the guidelines. We have also included a blank worksheet you can use in evaluating additional security types. The worksheet is available for download at [www.aba.com/LiquidityToolbox](http://www.aba.com/LiquidityToolbox).

## Liquidity/Yield Trade-off

The liquidity/yield scale is a quick measure of the trade-offs between liquidity and yield. A low score indicates high liquidity/low yield, where a high score indicates high yield/low liquidity.

## Breadth and Depth of Market

The price and marketability of securities is strongly affected by the breadth and depth of the market. Securities not in broad deep markets have wider bid/asked spreads, and may take longer to find a buyer. They are also more likely to be affected by market dislocations and, therefore, may experience a significant decrease in value if they need to be sold quickly.

## Credit Risk

The real or perceived credit risk of a security also affects its price and marketability. An increase in credit default spreads can cause a significant drop in value. Moreover, market dislocations can occur when there is a *perception* of increasing credit risk even though it may not have materialized.

The credit risk of a security also influences its ability to be used in a repurchase transaction (repo) and as collateral. The repo markets tend to shy away from securities with significant potential credit risk. A security with significant credit risk might be rejected as collateral for borrowings or potentially be subjected to significant haircuts.

## Interest Rate Risk

Interest rate risk is another factor in determining the use or sale of a security. Consider the following:

- The more interest rate risk in a security, the more volatile its value as rates changes
- Instruments with significant interest rate risk are less likely to be acceptable for repo transactions
- As market value drops in negative rate environments, haircuts are likely to increase

The effect of an institution's liquidity strategy on other risks and return would be highly dependent on both its current balance sheet structure and its business strategy. For some institutions, the result could be a minimal change in their current liquidity strategy with only a nominal impact on other forms of risk and return. However, for other financial institutions, the potential impact on risk and return could be dramatic.

## Option Risk

Option risk has a similar effect on the use or marketability of a security:

- The more option risk in a security the more volatile its value as rates change
- Instruments with significant option risk are less likely to be acceptable for repo transactions
- As market value drops in negative rate environments, haircuts are likely to increase
- Cash flows on instruments with embedded options can be materially affected by changes in interest rates

## Marketability at No or Minimum Loss

The evaluation of marketability at no or minimum loss is primarily focused on breadth and depth of market and the market's perception of the level of credit risk in the instrument. However, the judgment of marketability does not consider potential loss in value in adverse rate environments from interest rate risk and option risk.

## Acceptance as Collateral/Usability in Repo Transactions

It is very valuable to consider how widely a security is accepted as collateral across those providing collateralized borrowings and those wanting protection for balances above the FDIC insurance coverage maximum. In addition, it is good to consider ahead of time how widely a security is accepted in repo transactions.

## Treatment as *Highly Liquid Marketable Security*

Within the asset-based liquidity category, securities designated as HLUM securities are liquidity kings. They can be counted on to provide needed cash, almost no matter what happens. As there is little guidance, we assume if a security is not usable in repo transactions, it is not a *HLUM security*. The Basel III LCR creates two classes of qualifying assets, Level 1 and Level 2. While there are a number of factors that differentiate securities at Level 1 from those at Level 2, the most important distinction is that Level 1 assets carry a 0 percent risk weight under Basel II Risk Based Capital Standards.

Because the LCR has not been implemented in banking regulation in the U.S., the assessment of whether the securities described in the following section count is based on our judgment from reading and interpreting the Guidance Document and the Basel III standard.

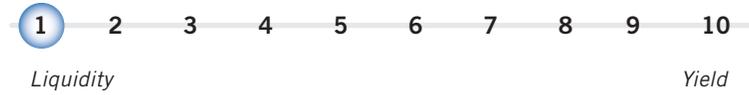
# Major Security Types

Community banks use many different kinds of securities in their investment portfolio. The following pages provide a review of the securities listed below, including a rating scale that approximates the trade-offs between liquidity and return. A 1-rated bond is highly liquid but has very low risk and return. A 10-rated bond is very illiquid and carries high levels of risk and return.

| Security Grade | Security Type                                |
|----------------|--|
| 1              | Federal Reserve Excess Balance Account (EBA) |
| 1              | U.S. Treasuries                              |
| 2              | Fed Funds Sold                               |
| 2              | Bullet (Non-Callable) Agencies (GSEs)        |
| 2              | Non-Financial Commercial Paper               |
| 3              | Callable Agencies                            |
| 3              | Money Market Instruments                     |
| 4              | Bank Issued CDs                              |
| 5              | Municipal Bonds                              |
| 6              | Agency Mortgage Obligations                  |
| 7              | Agency-Backed Mortgage-Backed Securities     |
| 8              | Corporate Bonds                              |
| 9              | Revenue Bonds                                |
| 10             | Asset-Backed Securities                      |

## Federal Reserve Excess Balance Account (EBA)

Limited-Purpose accounts at the Federal Reserve that earn interest



**Breadth and Depth of Market:** Must be a Federal Reserve Member to use

**Credit Risk:** None

**Interest Rate Risk:** None

**Option Risk:** None

**Marketability at No or Minimal Loss:** Funds become available on a daily basis

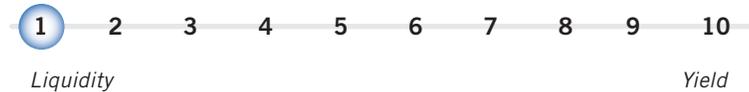
**Acceptance as Collateral:** N/A

**Usability in Repo Transaction:** N/A

**Treatment as *Highly Liquid Marketable Security*:** Yes. Would qualify as a Level 1 Asset.

## U.S. Treasuries

Debt obligation of the United States



**Breadth and Depth of Market:** Best in World

**Credit Risk:** None

**Interest Rate Risk:** Varies with term of bond

**Option Risk:** None

**Marketability at No or Minimal Loss:** Tight bid/ask spread but depends on term and rates

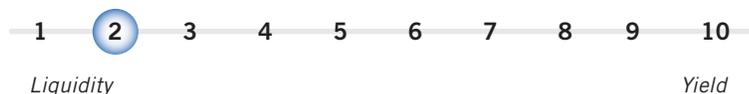
**Acceptance as Collateral:** All

**Usability in Repo Transaction:** Yes

**Treatment as *Highly Liquid Marketable Security*:** Yes. Subject to 0% haircut. Level 1 Asset.

## Fed Funds Sold

Overnight investment in other U.S. financial institutions



**Breadth and depth of market:** Generally very large

**Credit Risk:** Moderate as this is unsecured debt to another financial institution. However, financial institutions experiencing significant performance and regulatory safety and soundness problems are often cut off from this resource by intermediaries providing this resource.

**Interest Rate Risk:** None

**Option Risk:** None

**Marketability at no or minimal loss:** Fed Funds Sold automatically turn into cash the next day

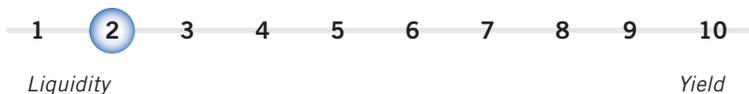
**Acceptance as collateral:** N/A

**Usability in Repo transaction:** N/A

**Treatment as *Highly Liquid Marketable Security*:** Yes. Might be judged to be a Level 2 asset as it has a risk weight of 20%.

## Bullet (Non-Callable) Agencies (GSEs)

GSE-Issued Bonds without calls



**Breadth and depth of market:** Very good, second only to Treasury market

**Credit Risk:** None

**Interest Rate Risk:** Based on term of bond

**Option Risk:** None

**Marketability at no or minimal loss:** Very good

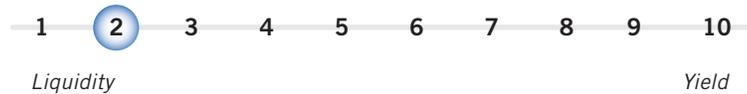
**Acceptance as collateral:** Almost everyone

**Usability in Repo transaction:** None

**Treatment as *Highly Liquid Marketable Security*:** Yes. Subject to 15% haircut. Level 2 Asset.

## Non-Financial Commercial Paper

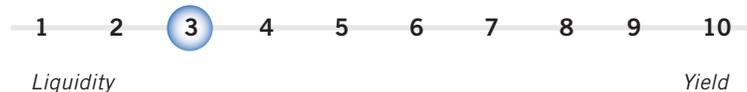
An unsecured promissory note with a fixed maturity of 1 to 270 days issued by large banks and corporations to raise funds to meet short-term debt obligations



|   |  |
|---|--|
| <b>Breadth and Depth of Market:</b>                           | Varies greatly based on quality of issuer  |
| <b>Credit Risk:</b>   | Varies greatly   |
| <b>Interest Rate Risk:</b>                                    | Low due to short-term nature (270 days maximum)  |
| <b>Option Risk:</b>   | N/A  |
| <b>Marketability at No or Minimal Loss:</b>                   | Generally good if the underlying company is strong   |
| <b>Acceptance as Collateral:</b>                              | Not many   |
| <b>Usability in Repo Transaction:</b>                         | No   |
| <b>Treatment as <i>Highly Liquid Marketable Security</i>:</b> | Should fall into same category as non-financial corporate bonds with a 15% haircut. Level 2 Asset. |

## Callable Agencies

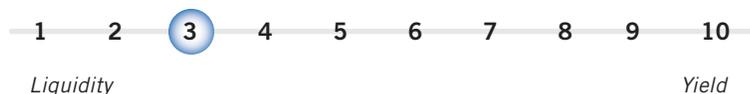
GSE-issued bonds with call options



|   |  |
|---|--|
| <b>Breadth and Depth of Market:</b>                           | Good, depending on size of issue and callable type                             |
| <b>Credit Risk:</b>   | None   |
| <b>Interest Rate Risk:</b>                                    | Depending on call features and term of bond                                    |
| <b>Option Risk:</b>   | Depending on call features   |
| <b>Marketability at No or Minimal Loss:</b>                   | Usually good unless small issue size, but not as good as non-callable agencies |
| <b>Acceptance as Collateral:</b>                              | Almost everyone  |
| <b>Usability in Repo Transaction:</b>                         | Yes  |
| <b>Treatment as <i>Highly Liquid Marketable Security</i>:</b> | Yes. Subject to 15% haircut. Level 2 Asset.                                    |

## Money Market Instruments

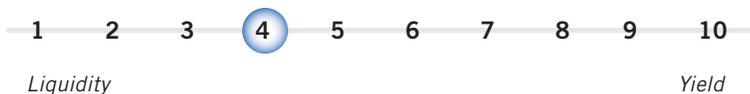
Debt instruments (usually GSEs) maturing in less than one year



|   |                              |
|---|------------------------------|
| <b>Breadth and Depth of Market:</b>                           | Very large                   |
| <b>Credit Risk:</b>   | None, if agencies            |
| <b>Interest Rate Risk:</b>                                    | Very low due to term         |
| <b>Option Risk:</b>   | Very low, if any             |
| <b>Marketability at No or Minimal Loss:</b>                   | Very good if of high quality |
| <b>Acceptance as Collateral:</b>                              | Many, if agency backed       |
| <b>Usability in Repo Transaction:</b>                         | No                           |
| <b>Treatment as <i>Highly Liquid Marketable Security</i>:</b> | No                           |

## Bank Issued CDs\*

Certificates of deposit issued by FDIC-insured banks

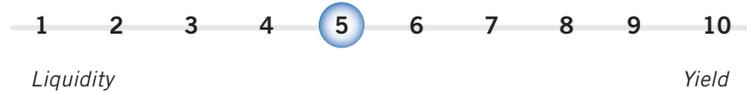


|   |   |
|---|---|
| <b>Breadth and Depth of Market:</b>                           | Generally very large  |
| <b>Credit Risk:</b>   | None, unless >\$250,000   |
| <b>Interest Rate Risk:</b>                                    | Generally low but dependent on term (generally no mark-to-market requirement) |
| <b>Option Risk:</b>   | Sometimes   |
| <b>Marketability at No or Minimal Loss:</b>                   | Secondary market exists but restrictions may be present for early withdrawal  |
| <b>Acceptance as Collateral:</b>                              | N/A   |
| <b>Usability in Repo Transaction:</b>                         | N/A   |
| <b>Treatment as <i>Highly Liquid Marketable Security</i>:</b> | No  |

\* Includes CDARS One-Way Sell, which offers FDIC insurance beyond \$250,000; however, no secondary market exists for these investments.

## Municipal Bonds

Tax-free obligations of states, counties, cities and school districts



|   |   |
|---|---|
| <b>Breadth and Depth of Market:</b>                           | Varies with issuer but generally very good  |
| <b>Credit Risk:</b>   | Varies with issuer but backed by property taxes if general obligations  |
| <b>Interest Rate Risk:</b>                                    | Based on term of bond   |
| <b>Option Risk:</b>   | Typically callable if longer term (greater than 10 years)   |
| <b>Marketability at No or Minimal Loss:</b>                   | Varies with issuer, term of the bond and market demand  |
| <b>Acceptance as Collateral:</b>                              | Most municipalities and states as well as Treasury Tax and Loan   |
| <b>Usability in Repo Transaction:</b>                         | No  |
| <b>Treatment as <i>Highly Liquid Marketable Security</i>:</b> | Not specifically addressed in Basel III standard but would appear to meet general definition in same way as corporate bonds if rated AA- or greater. Subject to 15% haircut. Assumed to be a Level 2 Asset. |

## Agency Mortgage Obligations

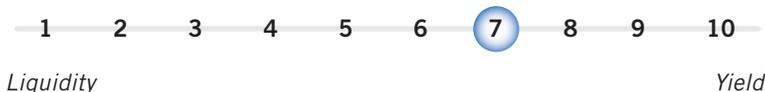
Pools of mortgage-backed securities structured into a wide variety of classes (tranches)



|   |   |
|---|---|
| <b>Breadth and Depth of Market:</b>                           | Varies greatly but a wide variety of issuers exist                                |
| <b>Credit Risk:</b>   | Essentially none if GSE-backed (FNMA, FHLMC, or GNMA)                             |
| <b>Interest Rate Risk:</b>                                    | Especially with long-term issues, negative convexity                              |
| <b>Option Risk:</b>   | Yes   |
| <b>Marketability at No or Minimal Loss:</b>                   | Not as good as bullet agencies and Treasuries but a large secondary market exists |
| <b>Acceptance as Collateral:</b>                              | Almost everyone   |
| <b>Usability in Repo Transaction:</b>                         | Yes   |
| <b>Treatment as <i>Highly Liquid Marketable Security</i>:</b> | Yes. Subject to 15% haircut. Level 2 Asset.                                       |

## Agency-Backed Mortgage-Backed Securities

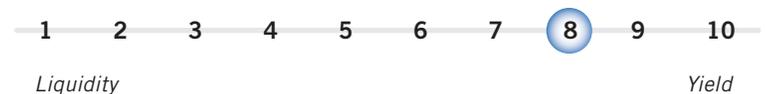
Pools of mortgages backed by agencies of the government



- Breadth and Depth of Market:** Very broad but a very wide variety of issuers exists
- Credit Risk:** Essentially none if GSE-backed (FNMA, FHLMC, or GNMA)
- Interest Rate Risk:** Especially with long-term issues, negative convexity
- Option Risk:** Yes
- Marketability at No or Minimal Loss:** Not as good as bullet agencies and Treasuries, but a large secondary market exists
- Acceptance as Collateral:** Almost everyone
- Usability in Repo Transaction:** Yes
- Treatment as *Highly Liquid Marketable Security*:** Yes. Subject to 15% haircut. Level 2 Asset.

## Corporate Bonds

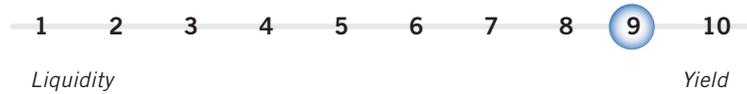
Debt issued by corporations



- Breadth and Depth of Market:** Varies greatly from issuer to issuer, based on quality
- Credit Risk:** Varies greatly from issuer to issuer and based on quality of underlying corporation
- Interest Rate Risk:** Based on term of bond
- Option Risk:** Can be callable
- Marketability at No or Minimal Loss:** Depends on issuer and size as well as quality
- Acceptance as Collateral:** Rarely
- Usability in Repo Transaction:** No
- Treatment as *Highly Liquid Marketable Security*:** Yes. Qualifies if rated AA- or better and traded in large, deep, and active markets. Subject to 15% haircut. Level 2 Asset.

## Revenue Bonds

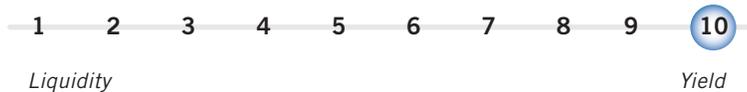
Debt obligations of municipalities focused on revenue-producing projects (e.g., hospitals, toll bridges, airports)



|   |   |
|---|---|
| <b>Breadth and Depth of Market:</b>                           | Varies greatly, but generally very large  |
| <b>Credit Risk:</b>   | Repayment based on strength of issuer and revenue-generated – not backed by property taxes  |
| <b>Interest Rate Risk:</b>                                    | Depending on term   |
| <b>Option Risk:</b>   | Can be callable if longterm   |
| <b>Marketability at No or Minimal Loss:</b>                   | Varies widely based on quality of underlying project and term                               |
| <b>Acceptance as Collateral:</b>                              | Sometimes   |
| <b>Usability in Repo Transaction:</b>                         | No  |
| <b>Treatment as <i>Highly Liquid Marketable Security</i>:</b> | Could be allowed with a 15% haircut. Level 2 Asset if judged by U.S. regulators to qualify. |

## Asset-Backed Securities

A security whose value and income payments are derived from, and collateralized (or “backed”) by, a specified pool of underlying assets



|   |   |
|---|---|
| <b>Breadth and Depth of Market:</b>                           | Varies greatly, based on underlying asset being pooled                |
| <b>Credit Risk:</b>   | High as there is no government guarantee                              |
| <b>Interest Rate Risk:</b>                                    | Depends on term   |
| <b>Option Risk:</b>   | Varies greatly due to lack of predictability of underlying collateral |
| <b>Marketability at No or Minimal Loss:</b>                   | Below average   |
| <b>Acceptance as Collateral:</b>                              | Rarely  |
| <b>Usability in Repo Transaction:</b>                         | No  |
| <b>Treatment as <i>Highly Liquid Marketable Security</i>:</b> | No  |

## Calculating the LCR Case Study

We have included a spreadsheet to view the Basel III LCR calculations for XYZ Bank, and then apply these calculations to your own institution in a blank spreadsheet. The spreadsheet is included in the LCR tab of the Excel workbook at [www.aba.com/LiquidityToolbox](http://www.aba.com/LiquidityToolbox). It follows the same general format as Annex A of the December 2010 Basel III International Framework for Liquidity Risk Measurement, Standards, and Monitoring. However, it has been modified in order to make it more accessible to community banks, by removing some of the input areas for hedging transactions and other financial instruments not commonly used by community banks. Also, we have “Americanized” some of the terminology used in the Basel document to be more in line with terminology used by community banks.

When you apply the LCR to your own institution, we recommend you review the worksheet in Annex A to determine whether there are any areas of your on-balance sheet or off-balance sheet activities that apply to you that are not addressed by the spreadsheet provided in Tool 4. As regulations evolve, we will make changes to this spreadsheet as appropriate.

## Changes in Level 2 Securities for the U.S. Market

We have opted *not to impose* the 40 percent limit on Level 2 securities in the LCR calculations provided by the Toolbox, because Basel III classifies two commonly-used securities as Level 2, Fed Funds Sold and agency securities. Next to cash, Fed Funds Sold is considered by bankers to be the most liquid investment in their investment portfolio. Agency securities are also classified as Level 2, but are readily accepted as collateral and in the repo markets. Because most community bank balance sheets are relatively heavily concentrated in GSE Securities (Level 2) and lightly concentrated in U.S. Treasury and fully guaranteed Agency securities, imposing the 40 percent limit at this time would result in significant repositioning of many bank investment portfolios, at a cost to yield. Because the Basel LCR will not be fully phased in to 2015, we advise that you wait to see how US regulators deal with the 40 percent limit and with security classification between Level 1 and Level 2.

## Reviewing the Securities Portfolio

XYZ management has opted to use the Basel III LCR calculation to analyze the XYZ asset-backed securities portfolio. Figure 4-1 shows the Basel III LCR qualified Level 1 and Level 2 assets as well as those securities considered to be non-qualifying. Its Level 1 assets are made up of the following:

- \$3,159,890 – Cash and Due From Banks
- \$1,241,660 – Treasury Securities

Of the total of \$4,401,550 of Level 1 assets, \$750,000 is pledged as collateral, leaving \$3,651,550 unpledged. The haircut applied to Level 1 securities is 0% providing a 100% availability factor, which means the entire \$3,651,550 is available to meet liquidity needs.

In addition, the XYZ security portfolio is made up of the following Level 2 security types. All Level 1 and Level 2 security entries reflect the market values of these securities rather than the *book values*.

- \$7,125,790 – Agency MBS Pass-Through Securities
- \$4,045,306 – Agency Backed CMOs
- \$2,083,280 – Fed Funds Sold and FHLB Overnight Investments

Of the total \$13,254,376 in Level 2 securities, \$4,400,000 are pledged as collateral leaving \$8,854,376 unpledged. A 15% collateral haircut is applied to Level 2 securities leaving an availability factor of 85% on the unpledged portion or \$7,526,220. Level 2 securities represents 67% of the total of highly liquid unencumbered marketable securities. Although XYZ has more than the allowed amount based on the Basel III guidelines, XYZ management believes this level is appropriate for the U.S. market.

The final section of Figure 4-1 shows the securities in the XYZ portfolio that do not meet Level 1 or Level 2 tests. That section included the following securities.

- \$1,195,000 – Bank CDs
- \$3,022,800 – GSE Stock

The overall total of cash, reserves, and securities that meet the Basel III LCR test for highly liquid unencumbered marketable securities is \$11,177,770.

Figure 4-1 XYZ Security Portfolio – Level 1 and Level 2 Assets

| Item  | Factor | Total             | Pledged          | Net of Pledged    | Factored Net Qualifying |
|---|--------|-------------------|------------------|-------------------|-------------------------|
| <b>Stock of High Quality Liquid Assets</b>      |        |                   |                  |                   |                         |
| <b>A. Level 1 Assets</b>                        |        |                   |                  |                   |                         |
| Cash & Due From Banks                           | 100%   | 3,159,890         | -                | 3,159,890         | 3,159,890               |
| Available Fed Reserves                          | 100%   | -                 | -                | -                 | -                       |
| Treasuries & Fully Guaranteed Agencies          | 100%   | 1,241,660         | 750,000          | 491,660           | 491,660                 |
| .....   | 100%   | -                 | -                | -                 | -                       |
| .....   | 100%   | -                 | -                | -                 | -                       |
| Total Level 1                                   |        | 4,401,550         | 750,000          | 3,651,550         | 3,651,550               |
| <b>B. Level 2 Assets</b>                        |        |                   |                  |                   |                         |
| Fed Funds Sold/FHLB Overnight                   | 85%    | 2,083,280         | -                | 2,083,280         | 1,770,788               |
| GSE Bonds                                       | 85%    | -                 | -                | -                 | -                       |
| Corporate Bonds >= AA-                          | 85%    | -                 | -                | -                 | -                       |
| Covered Bonds >= AA-                            | 85%    | -                 | -                | -                 | -                       |
| Commercial Paper                                | 85%    | -                 | -                | -                 | -                       |
| Municipal Bonds >=AA-                           | 85%    | -                 | -                | -                 | -                       |
| GSE MBS Pass-Throughs                           | 85%    | 7,125,790         | 1,150,000        | 5,975,790         | 5,079,422               |
| GSE CMO   | 85%    | 4,045,306         | 3,250,000        | 795,306           | 676,010                 |
| .....   | 85%    | -                 | -                | -                 | -                       |
| Total Level 2                                   |        | 13,254,376        | 4,400,000        | 8,854,376         | 7,526,220               |
| <b>C. Non-Qualifying Securities</b>             |        |                   |                  |                   |                         |
| Trust Preferred Securities                      | 0%     | -                 | -                | -                 | -                       |
| Bank CDs - Fully Insured                        | 0%     | 1,195,000         | -                | 1,195,000         | -                       |
| Non-Qual Comm Paper and Corp Bonds              | 0%     | -                 | -                | -                 | -                       |
| Non-Qual Municipal Bonds                        | 0%     | -                 | -                | -                 | -                       |
| Bank Issued Assets                              | 0%     | -                 | -                | -                 | -                       |
| GSE Stock                                       | 0%     | 3,022,800         | -                | 3,022,800         | -                       |
| Asset-Backed Securities >= AA-                  | 0%     | -                 | -                | -                 | -                       |
| Private Label MBS >= AA-                        | 0%     | -                 | -                | -                 | -                       |
| .....   | 0%     | -                 | -                | -                 | -                       |
| Total Non-Qualifying                            |        | 4,217,800         | -                | 4,217,800         | -                       |
| <b>Overall Total Cash, Reserves, Securities</b> |        | <b>21,873,726</b> | <b>5,150,000</b> | <b>16,723,726</b> | <b>11,177,770</b>       |

## Calculating Expected Cash Outflows

### Calculating Expected Deposit Outflows

Figure 4-2 breaks XYZ deposits down between retail and small business, and within each category between stable and less stable. CDs are further broken down between those maturing within 30 days, and those maturing beyond 30 days. XYZ management assumes early withdrawal penalties are effective, so all CDs with maturities beyond 30 days have 0% runoff rates. Based on the balance mix in Figure 4-2 and the Basel III LCR runoff rates, XYZ would expect to see \$4,224,050 in retail deposit runoffs and \$1,950,000 in small business runoffs in the 30-day LCR test.

Although Basel III LCR test classifies small business deposits as wholesale funding, XYZ management chose to include it in the deposit section, because the runoff assumptions applied to retail and small business deposits are the same. (See Figure 4-2.)

Figure 4-2 Deposit Outflows – Retail and Small Business

| Item   | Factor | Total       | Factored Net Outflow |
|--|--------|-------------|----------------------|
| <b>Cash Outflows</b>                         |        |             |                      |
| <b>A. Retail Deposits</b>                    |        |             |                      |
| Stable Deposits                              |        |             |                      |
| Non-Maturity Deposits                        | 5%     | 25,813,000  | 1,290,650            |
| CDs < 30 Day Maturity                        | 5%     | 4,618,000   | 230,900              |
| Less Stable Deposits                         |        |             |                      |
| Non-Maturity Deposits                        | 10%    | 27,025,000  | 2,702,500            |
| CDs < 30 Day Maturity                        | 10%    | -           | -                    |
| CDs > 30 Day Maty with Suff Penalties        | 0%     | 102,449,000 | -                    |
| Total Retail Deposits                        |        | 159,905,000 | 4,224,050            |
| <b>B1. Unsecured Wholesale - Small Busns</b> |        |             |                      |
| Stable Deposits                              |        |             |                      |
| Non-Maturity Deposits                        | 5%     | 5,000,000   | 250,000              |
| CDs < 30 Day Maturity                        | 5%     | -           | -                    |
| Less Stable Deposits                         |        |             |                      |
| Non-Maturity Deposits                        | 10%    | 17,000,000  | 1,700,000            |
| CDs < 30 Day Maturity                        | 10%    | -           | -                    |
| CDs > 30 Day Maty with Suff Penalties        | 0%     | -           | -                    |
| Total Small Business Deposits                |        | 22,000,000  | 1,950,000            |

## Calculating Expected Wholesale Funding Outflows

In addition to covering **deposit** outflows, funds need to be available to cover **wholesale funding** outflows, since under the LCR stress test, the institution is cut off from access to new Non-Core Funding.

In Figure 4-3, wholesale information is gathered by source. The first two lines focus primarily on deposits from large corporations. XYZ has no large corporation deposits. Brokered deposits maturing in the 30-day period covered by the Basel III LCR test are classified as an other unsecured funding source with a 100% runoff factor, resulting on \$6,171,000 in unsecured funding runoff in the 30-day period.

XYZ has \$2,506,000 of FHLB advances maturing in the Basel III LCR 30-day test period. The advances are backed by Level 2 assets (GSE Securities) as collateral. Because those securities were pledged as collateral, XYZ management excluded them in calculating XYZ's Qualifying assets in Figure 4-1. However, the FHLB advances are subject to a 15% runoff factor in Figure 4-3. Should XYZ be required to pay off the maturing advances, the collateral could be liquidated to fund the outflow. Management assumed a 15% haircut in turning the collateral into cash, which resulted in a secured funding runoff of \$375,900 in the 30-day period covered by the LCR test.

Figure 4-3 Wholesale Outflows and Other Requirements

| Item                                       | Factor | Total      | Factored Net Outflow |
|--|--------|------------|----------------------|
| <b>B2. Unsec Wholesale Funding - Other</b> |        |            |                      |
| Non-Fin Corp covered by dep insurance      | 5%     | -          | -                    |
| Non-Fin Corp with operating relshps        | 25%    | -          | -                    |
| Non-Financial Corps w/o Oper Rel           | 25%    | -          | -                    |
| Unsecured Debt - Other                     | 100%   | 6,171,000  | 6,171,000            |
| Total Unsecured - Other                    |        | 6,171,000  | 6,171,000            |
| <b>C. Secured Wholesale Funding</b>        |        |            |                      |
| Backed by Level 1 Assets                   | 0%     | -          | -                    |
| Backed by level 2 Assets                   | 15%    | 2,506,000  | 375,900              |
| Fed Reserve - Backed by Non-Qual           | 25%    | -          | -                    |
| Other Secured                              | 100%   | -          | -                    |
| Total Secured Wholesale Funding            |        | 2,506,000  | 375,900              |
| <b>D. Additional Requirements</b>          |        |            |                      |
| Undrawn portion of credit/liq facilities   |        |            |                      |
| Retail and small business Clients          | 5%     | 17,000,000 | 850,000              |
| Non-financial corporates - credit          | 10%    | -          | -                    |
| Non-financial corporates - liquidity       | 100%   | -          | -                    |
| Other legal entity - credit and liquidity  | 100%   | -          | -                    |
| Firm commitments to originate              | 100%   | 3,500,000  | 3,500,000            |
| Total Additional Requirements              |        | 20,500,000 | 4,350,000            |
| <b>Total Outflows</b>                      |        |            | <b>17,070,950</b>    |

## Calculating Expected Off-Balance Sheet Outflows

The final section of Figure 4-3 on page 25 deals with off-balance sheet outflows under the Basel III LCR test. XYZ has \$17,000,000 in unused credit lines to retail and small business clients. The LCR test assumes that customers will draw down 5% of those lines or \$850,000. In addition, they have \$3,500,000 in firm commitments to originate mortgages. In the LCR test utilization of 100% of those commitments is assumed, resulting in a cash outflow of \$3.5 million.

XYZ management feels it needs sufficient asset-based liquidity to fund \$4,350,000 million in off-balance sheet loan commitments in the next 30 days.

Total Outflows of \$17,070,950 at the bottom of Figure 4-3 are made up of the following portions:

- \$4,224,050 – Total Retail Deposit Outflows
- \$1,950,000 – Total Small Business Deposit Outflows
- \$6,171,000 – Total Unsecured Wholesale – Other Outflows
- \$375,900 – Total Secured Wholesale Funding Outflows
- \$4,350,000 – Total Additional Requirements to Fund Off-Balance Sheet Commitments

# Calculating Expected Cash Inflows

In the Basel III LCR calculation, cash inflows anticipated during the 30-day test can be used to partially offset the outflows identified in Figure 4-3 on page 25. However, inflows are limited to covering no more than 75% of outflows.

Figure 4-4 contains the data and assumptions XYZ management used to calculate cash inflows. XYZ expects to receive \$3,621,102 of loan repayments in the 30-day period covered by the LCR test due to contractual maturity and amortization. The cash flows shown here only reflect **contractual cash flows from performing loans**. The Basel III LCR test assumes XYZ will need to re-originate 50% of these cash flows to meet the ongoing needs of its customers. As a result, only \$1,810,551 will be available to cover outflows.

An area of potential contention as liquidity regulations are created for the U.S., is the treatment of anticipated loan prepayments. For XYZ, prepayments are projected at an additional \$2,372,778. Since the Basel III LCR instructions only address contractually-scheduled payments, XYZ management has decided not to consider anticipated loan prepayments as a source of cash flows when running the LCR test. For that reason, management applied a 0% factor to prepayments, cutting these cash flows to \$0, the most severe assumption on loan cash flows that could be made.

XYZ anticipates that \$56,000 of investment cash flows will occur in the 30-day period covered by the LCR test. Note that investment cash flows should not include cash flows from investments already counted as available Level 1 or Level 2 assets in the highly liquid unencumbered marketable securities calculation in Figure 4-1. Doing so would cause the cash flows from the 30-day period covered in the LCR test to be double-counted. 100% availability of the contractual investment cash flows is assumed, a total of \$56,000.

While XYZ anticipates prepayments off its mortgage-backed security portfolio, the assets in that portfolio are already counted as Level 2 assets. As a result, these prepayments are not considered in Figure 4-4, as doing so would double-count these cash flows.

XYZ also currently has \$1,000,000 of firm commitments to sell mortgages in the secondary market that will be executed in the next 30 days, resulting in an inflow of \$1,000,000. Total inflows anticipated in the 30 days of the Basel III LCR Test are \$2,866,551. The 75% test would limit inflows to 75% of outflows or \$12,803,213. Because the inflows in Figure 4-4 are well below the 75% ceiling, the entire amount of the inflows are included in the calculation.

Total Net Outflows (Outflows less Inflows) is \$14,204,399.

**Figure 4-4** Incoming 30-Day Cash Flows

| Item  | Factor | Total     | Factored Net Inflow |
|---|--------|-----------|---------------------|
| <b>Cash Inflows:</b>                            |        |           |                     |
| Reverse Repos or Security Borrowings            |        |           |                     |
| Level 1 Collateral                              | 0%     | -         | -                   |
| Level 2 Collateral                              | 15%    | -         | -                   |
| Other Collateral                                | 100%   | -         | -                   |
| Contractual Loan Repayments                     | 50%    | 3,621,102 | 1,810,551           |
| Expected Loan Prepayments                       | 0%     | 2,372,778 | -                   |
| Contractual Investment Matys & Repmts           | 100%   | 56,000    | 56,000              |
| Expected Investment Prepay/Calls                | 50%    | -         | -                   |
| Firm Commitments To Sell Loans                  | 100%   | 1,000,000 | 1,000,000           |
| Total Inflows (max 75% of outflows)             |        | -         | 2,866,551           |
| <b>Total Net Outflows (Outflow less Inflow)</b> |        |           | <b>14,204,399</b>   |

## LCR Calculation

The Basel III LCR test specifies that highly liquid unencumbered assets should be placed in the numerator and total net outflows be placed in the denominator in calculating the LCR. XYZ has only \$11,177,770 in net high quality liquid assets to cover \$14,204,399 in anticipated

net outgoing cash flows, a shortfall of \$3,026,629. The LCR is 78.7% as compared to the target ratio specified in the Basel III LCR requirement of 100%. XYZ fails the test.

Figure 4-5 LCR Calculation

|  |              |                     |               |
|--|--------------|---------------------|---------------|
| <b>Liquidity Coverage Ratio</b>            | <b>78.7%</b> | <b>Target Ratio</b> | <b>100.0%</b> |
| Numerator (Net High Quality Liquid Assets) | 11,177,770   | Excess(Short)       | (3,026,629)   |
| Denominator (Net Cash Outflows)            | 14,204,399   |                     |               |

## Resolving the Shortfall

Should XYZ management panic and take immediate and potentially costly actions to resolve the shortfall? Not necessarily. Should it begin planning strategically for bringing its balance sheet structure to a position where it can pass the LCR test within a reasonable amount of time? Yes, for a number of reasons:

- Dramatic balance sheet actions could have a significant negative effect on performance.
- If the institution was criticized in an examination for having inadequate levels of highly liquid unencumbered marketable securities, the plan would be a proactive move by the institution to respond to the regulatory criticism.

- The goal of the new liquidity standards is to position institutions to better deal with liquidity stress events in the future, including a short-term stress, such as the one modeled by the LCR test.

There are multiple options available to XYZ in resolving its shortfall, some tactical and some strategic.

**Increase level of asset-backed securities.** Certainly, XYZ management might move to increase their level of highly liquid unencumbered marketable securities. That balance sheet change was envisioned in the capital plan developed in Tool 1. As Figure 4-6 indicates, XYZ management planned to increase the investment/assets ratio from the current level of 6.5% to 9% by the end of Year 1 and to 12.0% by the end of the 5-year plan. In a \$300 million bank, the investment mix change would bring \$4.7 million into the investment portfolio in the first year. If the \$4.7 million was placed in highly liquid unencumbered marketable securities, the shortfall would be resolved in the first year of the capital plan.

**Reduce reliance on Non-Core Funding.** As an alternative, XYZ management might reduce its reliance on Non-Core Funding. That balance sheet change was envisioned in the capital plan developed in Tool 1. As Figure 4-7 illustrates, XYZ management plans to reduce its reliance on Non-Core Funding from 35.91% of assets to 28.40% of assets by the end of Year 1, and to 18.12% of assets in Year 5. The reduction in non-regulatory funding has the potential to reduce the need to fund outgoing non-regulatory cash flows over the long haul. But it may or may not provide relief for the need to fund those maturing cash flows over the short haul.

Figure 4-6 Investment Mix Strategic and Annual Goals

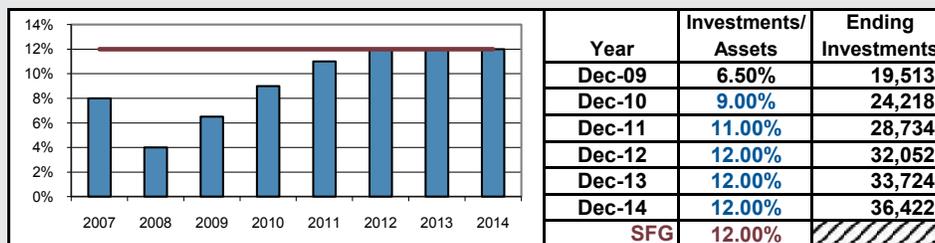
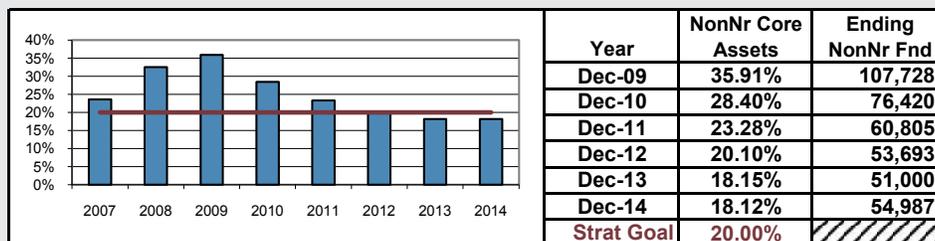


Figure 4-7 Non-Core Funding as Percent of Assets



**Move out of situations requiring collateral.** As Figure 4-8 illustrates, a total of \$5,150,000 of highly liquid unencumbered marketable securities is pledged as collateral making it unavailable to fund the 30-day liquidity needs called for in the LCR. XYZ management might consider:

- Reducing its reliance on Non-Core Funding requiring collateral, substituting Non-Core Funding sources not requiring collateral.
- Moving high-balance customers requiring collateral to protect uninsured deposits onto a program like the CDARS Reciprocal service where full deposit insurance is available without the need to post collateral on an ongoing basis.

**Keep fewer loans in portfolio.** Because XYZ originates loans for sale, they have the option of selling a greater percentage of their production and keeping less in portfolio. Such a change in strategy would reduce the need for asset-based liquidity to deal with a stress event like that modeled in the LCR.

All solutions have risk/return trade-offs. In addition, each solution has implications for liquidity for time frames longer than the one-month period tested by the LCR. Proposed solutions may also have implications for other forms of risk – like interest rate risk. Determining which potential solution to XYZ's short-term liquidity shortfall requires an asset liability management (ALM) environment where trade-offs between risk and return can be tested. An ALM process that provides for risk/return trade-off testing will be introduced and discussed in Tool 5.

**Figure 4-8** XYZ Security Portfolio – Level 1 and Level 2 Assets

| Item  | Factor | Total             | Pledged          | Net of Pledged    | Factored Net Qualifying |
|---|--------|-------------------|------------------|-------------------|-------------------------|
| <b>Stock of High Quality Liquid Assets</b>      |        |                   |                  |                   |                         |
| <b>A. Level 1 Assets</b>                        |        |                   |                  |                   |                         |
| Cash & Due From Banks                           | 100%   | 3,159,890         | -                | 3,159,890         | 3,159,890               |
| Available Fed Reserves                          | 100%   | -                 | -                | -                 | -                       |
| Treasuries & Fully Guaranteed Agencies          | 100%   | 1,241,660         | 750,000          | 491,660           | 491,660                 |
| .....   | 100%   | -                 | -                | -                 | -                       |
| .....   | 100%   | -                 | -                | -                 | -                       |
| Total Level 1                                   |        | 4,401,550         | 750,000          | 3,651,550         | 3,651,550               |
| <b>B. Level 2 Assets</b>                        |        |                   |                  |                   |                         |
| Fed Funds Sold/FHLB Overnight                   | 85%    | 2,083,280         | -                | 2,083,280         | 1,770,788               |
| GSE Bonds                                       | 85%    | -                 | -                | -                 | -                       |
| Corporate Bonds >= AA-                          | 85%    | -                 | -                | -                 | -                       |
| Covered Bonds >= AA-                            | 85%    | -                 | -                | -                 | -                       |
| Commercial Paper                                | 85%    | -                 | -                | -                 | -                       |
| Municipal Bonds >=AA-                           | 85%    | -                 | -                | -                 | -                       |
| GSE MBS Pass-Throughs                           | 85%    | 7,125,790         | 1,150,000        | 5,975,790         | 5,079,422               |
| GSE CMO   | 85%    | 4,045,306         | 3,250,000        | 795,306           | 676,010                 |
| .....   | 85%    | -                 | -                | -                 | -                       |
| Total Level 2                                   |        | 13,254,376        | 4,400,000        | 8,854,376         | 7,526,220               |
| <b>C. Non-Qualifying Securities</b>             |        |                   |                  |                   |                         |
| Trust Preferred Securities                      | 0%     | -                 | -                | -                 | -                       |
| Bank CDs - Fully Insured                        | 0%     | 1,195,000         | -                | 1,195,000         | -                       |
| Non-Qual Comm Paper and Corp Bonds              | 0%     | -                 | -                | -                 | -                       |
| Non-Qual Municipal Bonds                        | 0%     | -                 | -                | -                 | -                       |
| Bank Issued Assets                              | 0%     | -                 | -                | -                 | -                       |
| GSE Stock                                       | 0%     | 3,022,800         | -                | 3,022,800         | -                       |
| Asset-Backed Securities >= AA-                  | 0%     | -                 | -                | -                 | -                       |
| Private Label MBS >= AA-                        | 0%     | -                 | -                | -                 | -                       |
| .....   | 0%     | -                 | -                | -                 | -                       |
| Total Non-Qualifying                            |        | 4,217,800         | -                | 4,217,800         | -                       |
| <b>Overall Total Cash, Reserves, Securities</b> |        | <b>21,873,726</b> | <b>5,150,000</b> | <b>16,723,726</b> | <b>11,177,770</b>       |

## LCR and XYZ Bank

XYZ is currently in the midst of a credit quality issue that could impact loan repayments and loss of funds. The LCR test identified a shortfall of short-term liquidity to cover short-term outflows of funds under a stressed environment. However, the test failed to specifically relate to the four specific stress environments identified in Tool 1.

It might be tempting to attempt to set policy limits on minimum levels of highly liquid unencumbered marketable securities after running the test in Tool 4. However, it makes sense to defer setting policy and other limits until Tool 5 for the following reasons:

- There are multiple potential solutions to XYZ's shortfall relative to the LCR test. Each has its own risk/return tradeoffs. Some potential solutions require less asset-based liquidity than others.
- An additional tool – liquidity gaps – will be introduced in Tool 5. It makes more sense to defer policy limits until all the tools are reviewed.
- The tests run in Tool 4 are generic tests that utilize minimum acceptable haircuts and runoff assumptions under the LCR. Some of the liquidity stress scenarios identified in Tool 1 may require more significant assumptions in key areas.

